

Subchapter 3.1—Migration, Consolidation and Upgrades

Migration to MPE/iX HP e3000 Servers from “Classic” MPE V Servers

MPE/iX provides the least disruptive way to migrate from MPE V, and delivers the added advantages of increased functionality, lower operating costs, online and unattended backup, increased connectivity, and the collective benefits derived from adherence to industry standards. And, in part because of substantial savings in operational and support expenses, most upgrade investments offer a high calculated Return On Investment (ROI) with payback of under three years, or lease payments for a new system that are smaller than the monthly expenses formerly paid to support the older environment.

Level of Risk

- The “learning curve” for users and operators on an MPE/iX HP e3000 Server will be nearly nonexistent. They will generally be using the same terminal interface and the same applications that they have been accustomed to in the past. Command sets are immediately recognizable and understandable. Job Control Language (JCL) remains virtually identical. Extremely high compatibility protects a company’s investments in both software applications and user training.
- The “migration” to an MPE/iX HP e3000 Server will certainly be less painful and less time-consuming than ANY of the other alternatives available if the customer were to decide to change platforms. It is not a revolutionary move, but an evolutionary one.

Additionally, standard HP upgrade policies routinely allow Classic 3000 systems to remain onsite for up to 90 days after the new HP e3000 server is installed. This fact should eliminate any lingering transition concerns. With advance planning and file preparation, most upgrade customers report minimal user interruptions, if any. Testing and “cut-over” take place smoothly and completely over a single weekend.

- The “learning curve” for systems management/ operations personnel is minimal in moving to an MPE/iX HP e3000 Server. Although some training is required, the MPE/iX HP e3000 server is built upon most of the same tools and capabilities that they are accustomed to already. Any other alternative would require learning something totally different from an operations and systems management viewpoint.

Applications for Business Needs

Classic HP 3000s are built upon a Complex Instruction Set Computer (CISC) architecture, while today’s Series 900 HP e3000 Servers are based on HP’s Reduced Instruction Set Computer (RISC) implementation, known as Precision Architecture-RISC (PA-RISC). Complete compatibility between the MPE V and MPE/iX operating systems ensures existing MPE V applications will run virtually unchanged (but faster) when they are brought up under Compatibility Mode on new MPE/iX HP e3000 Servers. Typically, with only minor modifications, these applications run much faster still in Native Mode, which enables them to take fuller advantage of PA-RISC speed and functional capabilities. (Even in the few situations where specific modifications are required, good diagnostic programs and cost-efficient solutions exist to complete any necessary changes). This protection of applications across upgrade paths and over time is a critical HP e3000 strength.

There are a number of best-in-class solutions available now on the HP e3000. Many are designed around Web enablement, open system and client/server technologies, including graphical user interfaces, relational databases, and fourth-generation languages (4GLs). This makes the software easy to customize to a company’s specific needs, and ensures portability across hardware platforms.



Another major advantage of upgrading to MPE/iX technology is the ability to more easily access and manipulate business information in ways that significantly increase the ability to make informed management decisions. The availability of toolsets for IMAGE/SQL (today's generation of TurboIMAGE) makes this possible. With IMAGE/SQL, you can have read/write access to data in your TurboIMAGE database using industry-standard SQL commands and user-friendly, PC-based tools.

These toolsets—available only on MPE/iX, not the very old and out of support MPE V—buffer users from the platform and can even protect development efforts into the future. SQL capabilities allow the use of a company's vast amounts of data (orders, inventory, production statistics, shipments, forecasts, customer details, etc.) for management and decision support purposes in an easier, more powerful way than ever before.

The recent addition of the WebWise internet suite of tools to MPE/iX—such as the MPE/iX Secure Web Server functionality and the Lutris Enhydra Java/XML Open Application Server based on open source Enhydra—enable the flexible development and deployment of Internet, wireless or e-commerce applications into old business models.

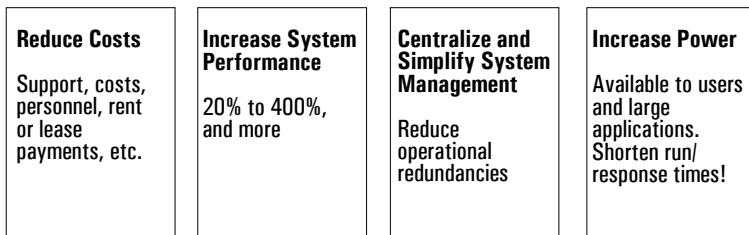
Also, for many companies, the first step in the evolution towards *client/server computing* is integrating desktop devices on a network and using the HP e3000 as a server. The upgraded HP e3000 functions well in a PC integration environment, and offers many advantages over an Intel-based PC server. Noteworthy HP e3000 advantages include superior scalability, data integrity, and security, as well as centralized system and network management.

Furthermore, using an HP e3000 as a server allows full integration across all systems, large and small, in the environment, including access to vital information in IMAGE/SQL databases.

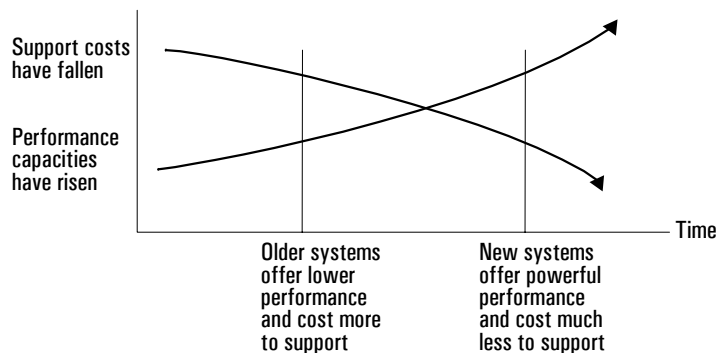
Consolidating HP e3000 Servers

Consolidation of several HP e3000 Servers may provide benefits in reduced costs, increase performance and centralized and simplified systems management (see **Figure 3.1.1**).

Figure 3.1.1 Why Consolidate?



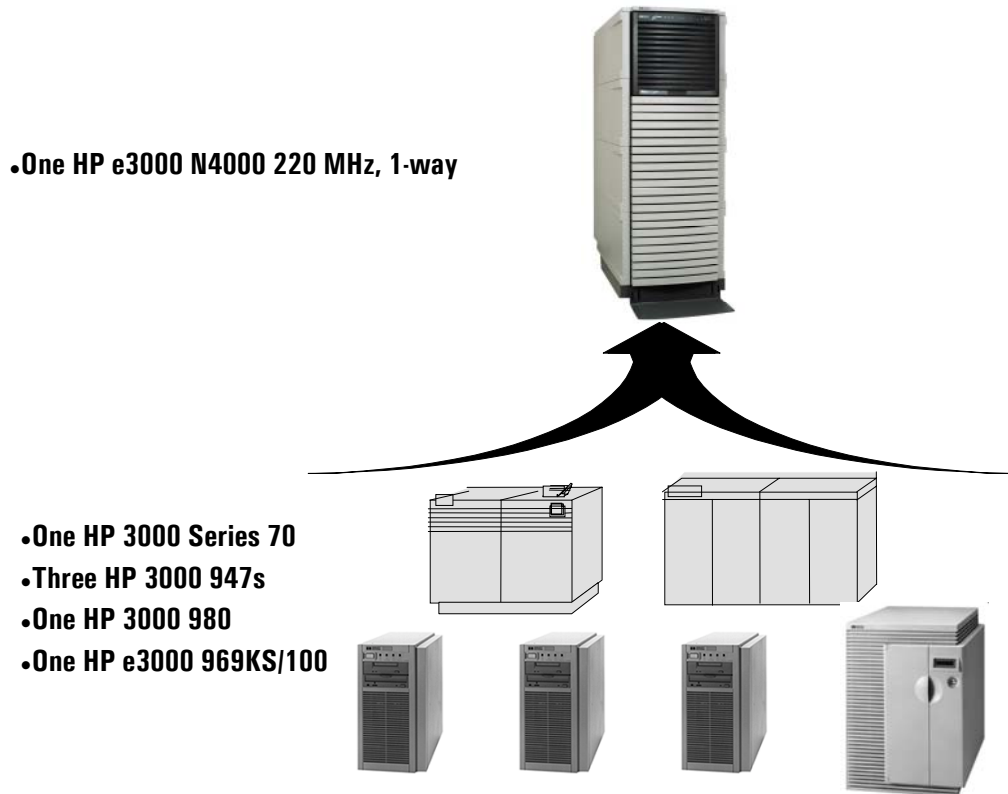
Industry trends simply make consolidation an obvious choice:



Performance

It is not difficult to determine whether a specific new HP e3000 is likely to meet the performance needs of consolidating several older HP 3000 Servers. When consolidating several HP e3000 Servers, simply add the relative performance of the various “old HP 3000 Servers” (refer to **Chapter 1**) and make sure that this sum is less than 80% of the new targeted HP e3000 Server’s relative performance (see **Figure 3.1.2** for an example). However, do not consider performance alone. Look at memory, disk storage, total number of users and other system resources that will be needed on the consolidated server.

Figure 3.1.2 Consolidate with Room to Spare with the HP e3000 N-Class



Memory Consolidations

When sizing a system consolidation, it is *critical* that adequate memory be configured. If not, serious performance implications will result, and expected performance will not scale with CPU processor speed.

Please refer to the specific HP e3000 A- or N-Class Server subchapter for memory sizing guidelines. Pay particular attention with the HP e3000 N-Class Servers to the possibilities for increasing performance with memory sizes up to 16 GB.

Disk Consolidations

When considering a HP e3000 Server consolidation, it is important to examine your current environment and determine whether or not I/O capacity must also be increased. A server that is disk-bottlenecked will not scale with CPU processor speed. Thus, adequate disk I/O bandwidth is imperative to the success of a server consolidation.

This is a considerably more difficult task, as performance tool(s) are necessary to understand and measure disk I/O rates. There are many excellent performance monitoring and management tools available from HP and third parties. If the customer does not have an online performance monitoring tool, such as GlancePlus/iX, provide demonstration copies of performance monitoring and/or management tools. These utilities will enable you to examine the server and estimate disk I/O rates and capacity.

Both performance monitoring and management tools will provide metrics regarding disk I/O rates. Performance tools can also be used to examine other disk I/O statistics (i.e., CPU paused for disk and individual disk drive utilization rates).

Here are some basic guidelines and rules of thumb regarding disk I/O capacity:

Strive for the following:

- I/O rate per drive should be ≤ 20 -25 I/Os per second (peak I/O rates may be slightly higher).
- Choose a hardware configuration layout designed to spread I/Os across multiple drives, I/O cards, and channels.
- Having more disk drives is better than having fewer disk drives.

Beware of the following, as they could create or contribute to a disk I/O bottleneck:

- Reduction in the number of spindles
- Several disk arrays on the same I/O card

If you decide to move forward with the consolidation, remember to set a precedent for good practices and regular maintenance. Proactive system monitoring and regular maintenance will ensure the future success of the server consolidation into which you've put so much work. Here's a brief "to-do" checklist of action items that will help to facilitate disk I/O:

- Monitor disk I/O throughput regularly (i.e., I/O rate per drive, CPU paused for disk, disk utilization, etc.).
- Implement configuration changes proactively and on a regular basis.
- Perform regular database maintenance to alleviate migrating secondaries, inefficient pointers, and other problems that generate unnecessary I/Os.
- Spread heavily accessed user files across different disk drives.
- Monitor for sufficient free disk space on all drives.
- Optimize UDC files, and use command files instead when appropriate.
- Archive files that are not being accessed.
- Avoid excessive file opens/closes.

Table Limitations

Tools Needed

To evaluate table limitations in HP e3000 Servers, you will need to work with the following tools:

- TBLMON (Interex Contributed Library Program)
- :SYSGEN.PUB.SYS (MPE FOS utility)
- :NSCONTROL and :SHOWJOB STATUS (MPE commands)

TBLMON is a native-mode program that monitors system table utilization on MPE/iX-based systems. The utility formats MPE/iX standard tables to reveal current and highest usage levels. The TBLMON utility was written by Hewlett-Packard's Research and Development Lab. You can obtain a copy of the TBLMON utility from the Interex Conference Swap Tape or the Interex Contributed Software Library.

For Classic HP 3000 servers, the MPE V-based version of the SYSINFO utility is available for retrieving table utilization metrics. However, rates are typically so much lower on MPE V-based systems that, for the purpose of estimations, it is sufficient to measure table utilization only on MPE/iX-based servers that are involved in the consolidation.

Server configuration information, such as the number of disk drives, can be obtained by running :SYSGEN.PUB.SYS. :SYSGEN is an MPE/iX FOS utility used to modify and view server configuration data. The input/output (I/O) module of the utility will reveal the types of logical devices configured on the server. For further information regarding :SYSGEN, consult the *System Startup, Configuration and Shutdown Reference Manual* (publication number 32650-90042).

You can view datacomm server information by checking the status on your network with :NSCONTROL STATUS = USERS,SERVERS. VTSERVERS are among the server processes displayed. Node Manager (NM) capability is needed to execute the :NSCONTROL command. The :SHOWJOB STATUS command will list out the number of users (and jobs) logged on. :NSCONTROL will help to identify those users who are accessing the server remotely and are not directly connected to the server.

How to Estimate Table Usage for a System Consolidation

To determine whether or not table limits could be an issue, run the TBLMON utility on each of the MPE/iX-based servers involved in the consolidation. This will inform you how server table resources are being utilized on existing servers.

Table maximums vary depending upon operating system release and patches installed; they are not system-model dependent. For example, most maximum table sizes are identical for a uniprocessor HP e3000 A-Class Server and a multi-processor HP e3000 N-Class Server that are both running MPE/iX 7.0.

For each table (i.e., PCB/PIB), add up the utilization totals for each of the systems to be consolidated. Compare the summation to the maximum table size for that particular table. If the total is well under the maximum number of entries for that particular table—no problem.

However, if the total number of entries approaches the maximum table size, more detailed analysis may be necessary to determine whether or not a table limit could affect CPU scaling. In the vast majority of cases, table utilization will *not* be a problem. HP pays close attention to table capacity issues and expands tables on new operating system releases to accommodate the larger and larger workloads inherent with new high-end server models.

Upgrades

Field Upgrades

Field upgrades provide a simple and cost-effective way of increasing the power and capabilities of your HP e3000 Business Server. Upgrades typically fall into four separate categories:

- Chassis upgrades—to increase the number of I/O slots—where allowed
- Increases in user license levels (only applicable to HP e3000 9x8, 9x9KS and 997 servers since all HP e3000 A- and N-Class Servers are shipped with an unlimited user license).
- Processor upgrades (either faster or more)
- Additional memory

Refer to the *HP e3000 Business Servers Ordering Guide* for detailed ordering information.

HP e3000 A- and N-Class Field Upgrades

To simplify ordering of these components, all field upgrades are in either the HP e3000 A-Class or N-Class upgrade menus.

In order to upgrade the server, you may need to order a chassis upgrade product number for the upgrade menu. If more or differing processors are also being order, these processor product numbers must be also order. If processors are being traded in for a return credit, then return credit product numbers must also be order. On the upgrade menus, there are also opportunities to purchase more memory, integrated disk drives, field racking kits, and MPE/iX paper documentation.

User license levels do not need to ever be upgraded on HP e3000 A- and N-Class Servers since these servers are always shipped with an Unlimited user license level.

As of May 1, 2001, a Structured Solution Product (SSP) number is not required to be used with the HP e3000 A-Class and N-Class upgrade menus.

9x8 and 9x9KS Field Upgrades

To simplify ordering of these components, all field upgrades are in a menu Structured Solution Product (SSP) structure, one for the HP e3000 9x8 Servers and one for the HP e3000 997 Servers. These upgrade menus should be used when upgrading a system. Each menu has a unique identifying SSP product number. Therefore, in order to upgrade the chassis, you need to order both the menu product number as well as the chassis upgrade product number and the appropriate option. Similarly, to upgrade the processor along with the base user license, you must order the menu SSP product number as well as the appropriate user license product number with the correct option. These menus can also be used to more memory, integrated peripherals, field racking kits, and MPE/iX paper documentation.

99x Field Upgrades

Field upgrades for HP e3000 99x servers are ordered using their own field upgrade menu. As of September 1, 2001, sub-family upgrades (i.e., 992 to 997, 995 to 997, or 996 to 997) are no longer offered for sale. To add additional 997 processors, multiple options are offered which will increase the ways of 997 multi-processing in increments of two processors (two- to four-way, four- to six-way, etc.). For older 997 Servers that are odd-way multi-processing, options exist to go from odd to even way multi-processing. Limits on the ways of multi-processing (twelve-way) continue to be maintained for HP e3000 997 Servers. HP e3000 997 field upgrade menus also allow for the increase in I/O slots, user license levels, memory capacity, and user license levels.

Subchapter 3.2—Hardware Conversion Kits

Introduction

Hewlett-Packard offers two different Precision Architecture RISC (PA-RISC) server platforms: HP e3000 servers running the MPE/iX operating system and HP Servers running the HP-UX operating system (HP 9000). Since the MPE/iX and HP-UX operating systems leverage the same hardware, HP is able to offer customers with the latest HP e3000 platforms the ability to easily convert them to HP-UX servers using HP e3000 Hardware Conversion Kits.

HP e3000 Transition Considerations

A complete HP e3000 transition requires a lot more than simply converting the hardware. Any time that your business requirements dictate such a transition, a number of areas need to be evaluated. Detailed transition plans need to be developed for applications (homegrown and third-party); end-user, developer, and administrator skills; hardware and operating systems; data; system management and networks. Refer to the list of questions at the end of this subchapter for a partial list of questions that should be considered in planning a transition. Hewlett-Packard also offers a white paper, “HP e3000 Transition Considerations” (5980-8369EN) to aid in this planning process.

General Product Description

The HP e3000 Hardware Conversion Kits are available for these servers:

- A-Class servers
- N-Class servers
- 9x9KS (929KS/030, 939KS/030, 979KS, 989KS) to K-Class servers

For customers who are running earlier HP e3000 900 Series servers, Hewlett-Packard offers generous trade-in credits towards the purchase of HP-UX servers. The HP Trade-Up Program provides an easy, inexpensive way for customers to enjoy the benefits of being on the latest HP-UX server technology.

***Note:** HP does not offer HP-UX server to HP e3000 server hardware conversion kits.*

The HP e3000 Hardware Conversion Kits include the following items:

- PA-RISC firmware and stable store changes
- HP-UX server nameplates, platform labels, and front bezel

The 9x9KS conversion kit also includes a HP-UX Compatible Core I/O Card (Multi-Function I/O Card).

The HP-UX Operating Environment License-To-Use and media kit must be ordered separately. Basic Environment LTU is available at no charge.

Conversions result in the equivalent HP-UX server (or the next higher performing server if there is no corresponding HP-UX server).

HP e3000 Hardware Conversion Kits include HP installation. This covers the installation of any conversion hardware and firmware and the loading of the HP-UX Operating Environment. Any changed hardware and/or firmware components are covered under a standard HP one-year warranty. All other hardware and/or firmware components are covered under their original warranty.

Conversion Planning

In general, the intent of the conversion kits is to convert the HP e3000 server to an HP-UX server and to replace the MPE/iX Operating System with the HP-UX Operating Environment. For upgrades in performance, increases in memory or I/O capacities, additions of peripherals, upgrades of the HP-UX Operating Environment, or the addition of various networking, software, database or systems management packages, it is expected that the customer will have to purchase appropriate upgrade or add-on products. See the *HP UNIX Servers Ordering Guide* for ordering information.

In planning a conversion, thought should be given to cabling and network connection issues. If network connections are included with the converted HP-UX server, care should be taken in planning these connections. HP e3000 and HP-UX server MFIO cards support differing network connections and may require the addition of special network connection adapters. See the appropriate section of the *HP UNIX Servers Configuration Guide* for more information.

Support of Related HP e3000 Products on HP-UX Servers

Most I/O cards, peripherals, networking and storage products supported on HP e3000 servers are also supported on converted HP-UX servers. Customers may have the need to add additional peripherals to meet the business requirements of their new HP-UX server.

A CD-ROM drive will be required on the converted HP-UX server for software distribution and updates.

The *HP UNIX Servers Ordering Guide* and the *HP UNIX Servers Configuration Guide*, along with their addendum(s), identify all products that are supported on HP-UX servers. These documents should be consulted in association with a local HP sales representative to determine which products included with the HP e3000 server can also be supported on the converted HP-UX server.

Server and Application Performance

Since performance is very application-, operating system- and workload- dependent, the comparative performance between the original MPE/iX server and your converted HP-UX server may vary. Hewlett-Packard offers a broad range of HP-UX server upgrade products, which can be used to extend your hardware investment even further. Server upgrade products allow you to add more processors, upgrade to a higher performing processor, add more memory, and add more I/O. See the *HP UNIX Servers Ordering Guide* for ordering information.

Support Contract Administration

HP e3000 server and software support contracts will be transitioned to new HP-UX server and software support contracts on the day of conversion with credit given for any unused portions of the previous contracts. The HP CE initiates the support contract changes during the installation process.

Questions to be Considered When Planning a Server Conversion

- Will existing MPE/iX applications and data base environments need to be migrated, or will new HP-UX applications and data base environments be developed and/or acquired?
- Will data stored on the original server (i.e., sales histories, customer profiles, etc.) need to be accessible by the new server?
 - If yes, will this be accomplished by migrating the data to the new HP-UX server, or will an HP e3000 server remain in the network, allowing applications on the converted server to remotely access this data?
- What operational tools or processes previously used in the MPE/iX environment for managing that server will be required in the HP-UX environment?
 - Which of these tools are provided with the new operating system and which need to be acquired from HP or its software partners?
- What additional hardware changes need to be made?
 - Is more processing power or memory required because of application demands?
 - Will all the peripherals, networks and associated cabling used on the original server work on the new server?
 - Are more peripherals required because of new or rewritten applications?
- What training will be needed for operational and programming staffs and for the application end users to insure that the new environment can be efficiently managed and used?

